

CLAIMS

1. A semiconductor package, comprising:
 - a substrate;
 - a semiconductor die attached to said substrate;
 - a housing part attached to said substrate and arranged to surround said semiconductor die; and
 - solidified molding material arranged around said housing part and adhering to said substrate to secure said housing part in position on said substrate.
2. The semiconductor package of claim 1 wherein said semiconductor die is attached to said substrate by means of an adhesive substance.
3. The semiconductor package of claim 1 wherein the substrate includes a channel arranged on its upper surface for receiving a portion of the housing part.
4. The semiconductor package of claim 1 wherein a portion of the housing part is arranged to penetrate the substrate.
5. The semiconductor package of claim 1 wherein the substrate is formed from an epoxy material.
6. The semiconductor package of claim 1 wherein the housing part is formed from a thermosetting or thermoplastic material.
7. The semiconductor package of claim 1 wherein the package additionally includes an insert for attachment to said housing part.

8. The semiconductor package of claim 7 wherein the insert is provided with a screw thread for co-operation with a complementary thread provided in the housing part.

9. The semiconductor package of claim 7 wherein the insert is arranged to provide a snap-fit connection with the housing part.

10. The semiconductor package of claim 7 wherein said insert includes a lens, and said lens is arranged such that it is positioned above said semiconductor die.

11. The semiconductor package of claim 7 wherein said insert includes a channel for allowing the through-flow of a fluid such that said fluid is able to contact an active portion of said semiconductor.

12. The semiconductor package of claim 12 wherein said active portion of said semiconductor is sealed from the remainder of said housing by a sealing material.

13. The semiconductor package of claim 7 wherein said insert is provided with a channel for allowing the through-flow of a cooling material and said insert is arranged to be thermally coupled to said semiconductor to facilitate the cooling of said semiconductor.

14. The semiconductor package of claim 7 wherein said insert includes a thermally conductive material and a plurality of cooling fins, and said insert is thermally coupled to said semiconductor.

15. The semiconductor package of claim 1 wherein the portion of said housing part that contacts said substrate is substantially flat and includes a channel inscribed in said flat portion.

16. A semiconductor package array wherein said array comprises a plurality of semiconductor packages as claimed in claim 1 mounted on a single substrate.

17. A method of manufacturing a semiconductor device, including the steps of:

attaching a semiconductor die to a substrate;
positioning a housing on the substrate, in a position surrounding the die;
positioning a mold over the housing such that an upper surface of the housing abuts against an inner surface of the mold; and
injecting into the mold a molding material.

18. The method of claim 17 further including the step of wire bonding the semiconductor die to selected pads on the substrate.

19. The method of claim 17 wherein the step of attaching a semiconductor die to a substrate includes the step of applying an adhesive substance to the substrate prior to applying the semiconductor die.

20. The method of claim 17 wherein the step of injecting a molding material includes the step of bringing the molding material to a temperature in the range of 160°C-185°C and a pressure of 75bar \pm 10% before it is injected into the mold.

21. The method of claim 17 wherein the step of positioning the housing includes positioning the housing in a channel that surrounds the semiconductor die.

22. The method of claim 17 wherein the step of positioning the housing includes penetrating part of the substrate with a portion of the housing.

23. The method of claim 17 wherein an inner surface of the mold is arranged to be deformable such that a tight fit against the upper surface of the housing is achieved.

24. A semiconductor device, comprising:
a substrate having a semiconductor die attached thereto;
a housing have a sidewall surrounding an open interior that is in communication with an open first end, with the sidewall having a closed second end, the first open end sized and shaped to circumscribe the channel, the closed second end having an opening formed therein to enable fluid communication with the open interior;
and

molding material affixed to the substrate and to the housing to hold the housing in place and to seal the housing to the substrate to prevent fluid communication between the sidewall of the housing and the substrate.

25. A semiconductor device, comprising:
a substrate having a semiconductor die attached to a surface thereof;
a housing having a sidewall surrounding an open interior that is in communication with a first open end and a second open end of the sidewall, the first open end sized and shaped to circumscribe the semiconductor die;
an adaptor configured to be received in the second open end of the housing and to expose an active portion of the semiconductor die to at least one of light, fluid, fluid pressure, and fluid temperature without damaging or altering semiconductor die area adjacent the active area of the semiconductor die; and

molding material affixed to the substrate and the housing to hold the housing in place and to seal the housing to the substrate to prevent fluid communication between the sidewall and the substrate.

26. The device of claim 25 wherein the adaptor is configured to hold a lens in position over the active area of the semiconductor die.

27. The device of claim 25 wherein the adaptor is configured to include a channel having a first open end to receive fluid and a second open end to drain fluid, the channel further comprising an opening formed over the active area of the semiconductor die to permit direct fluid contact with the semiconductor die.

28. The device of claim 25 wherein the adaptor includes a longitudinal axial bore opening to an exterior of the adaptor to provide direct access to the active area of the semiconductor device from outside the adaptor.

29. The device of claim 25 wherein the insert comprises a solid piece of material in direct contact with the active area of the semiconductor die and configured to dissipate heat from the semiconductor die.

30. A semiconductor device, comprising:
a substrate having a semiconductor die attached thereto and a channel formed in the substrate circumscribing the semiconductor die;
a housing having a sidewall surrounding an open interior that is in communication with a first open end and a second open end of the sidewall, the sidewall positioned in the channel in the substrate and sized and shaped for slideable reception within the channel;
an adaptor configured to be received in the second open end of the housing and to expose an active portion of the semiconductor die to at least one of light,

fluid, pressure, and temperature without damaging or altering the semiconductor die adjacent the active area of the semiconductor die; and

a molding material affixed to the substrate and the housing to hold the housing in place and to seal the housing to the substrate.

31. The device of claim 30 wherein the adaptor is configured to hold a lens in position over the active area of the semiconductor die.

32. The device of claim 30 wherein the adaptor is configured to include a channel having a first open end to receive fluid and a second open end to drain fluid, the channel further comprising an opening formed over the active area of the semiconductor die to permit direct fluid contact with the semiconductor die.

33. The device of claim 30 wherein the adaptor includes a longitudinal axial bore opening to an exterior of the adaptor to provide direct access to the active area of the semiconductor device from outside the adaptor.

34. The device of claim 30 wherein the insert comprises a solid piece of material in direct contact with the active area of the semiconductor die and configured to dissipate heat from the semiconductor die.